Exercise Set 2

Principles of Computing

Week 4 of Fall Semester, 2024

1 Exercises

Python

1. 1.1. What is the *type* and *value* of `"hello, world!"[4]`?

   1.2. What is the *type* and *value* of `[4]`?

2. Let `line = "A cup of espresso here is €2, and a croissant is €5."`.

   Suppose this is all we know for this problem: there are two one-digit integers in this string that represent the prices of a coffee and pastry respectively.

   2.1. What does `line[::-1].index(" ")` evaluate to?

   2.2. What value does `line.lower().index("a")` return?

   2.3. What would be the result of `line[:line.index("2")]`?

   2.4. What if we instead evaluated `line[:line.index("3")]`?

   2.5. How do we find the price of two coffees and a pastry?

3. Define a function in `~/exercise03.py` that, given an input string, prints the longest *word*[1] in the string along with its length.[2]

```python
def longestr(sentence):
  # code here

longestr("Memory believes before knowing remembers.")
longestr("the reason for living was to get ready to stay dead")
longestr("I was the shadow of the waxwing slain")
longestr("By the false azure in the windowpane.")
```

```
username@host ~ python3 exercise03.py
remembers. 10
reason 6
waxwing 7
windowpane. 11
```

Running this file should display in the terminal the output shown here to the left.

4. Suppose you have a file in your home directory named `exercise04.py`. In this file, define a function that takes one integer as input and returns the product of all of that integer's digits as its output.

```python
def digimon(num):
# code here

print(digimon(2), digimon(16), digimon(128), digimon(1024))
```

```
username@host ~ python3 exercise04.py
2 6 16 0
```

Running this file should display in the terminal the output shown here to the left.

[1] A *word* is a contiguous string or substring of characters containing no whitespace and which is only surrounded by whitespace characters.

[2] You may break ties between words arbitrarily.

2 *Solutions*

Python

1. 1.1. The *type* is `str` and the *value* is `"o"`.
   This is the fifth character of the string `"hello, world!"`.

   1.2. The *type* is `list` and the *value* is `[4]`.
   This is a list containing the integer `4` as its only element.

2. 2.1. The `int` object `3`.

   2.2. The `int` object `0`.

   2.3. The `str` object `"A cup of espresso here is €"`.

   2.4. This throws a `ValueError` since `"3"` isn't a substring of `line`.

   2.5. Here's one way we can do this using a `for` loop and a `list`.

```python
seen_a_num_yet = False
digits = ["0", "1", "2", "3", "4", "5", "6", "7", "8", "9"]
for char in line:
  if char in digits:
    if not seen_a_num_yet:
      coffee = int(char)
      seen_a_num_yet = True
    else:
      pastry = int(char)
print(2*coffee + pastry)
```

3. Here's one way to do this using a `for` loop.

```python
def longestr(sentence):
  current = ""
  longest = ""
  sentence += " "
  for char in sentence:
    if char == " ":
      if len(current) > len(longest):
        longest = current
      current = ""
    else:
      current += char
  print(longest, len(longest))
```

4. Here's one way to do this using a `for` loop.

```python
def digimon(num):
  product = 1
  for char in str(num):
    product *= int(char)
  return product
```